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TO ALL WHOM IT MAY CONCERN:

Be it known that Jean-Luc Berard and Patrice  
Leclercq, both citizens of France, have invented an  
improvement in an

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ERGONOMIC TOOTHBRUSH

of which the following is a

SPECIFICATION

BACKGROUND OF INVENTION

The present invention relates to a ergonomic  
10 toothbrush which allows complete and easy brushing of a  
user's teeth with little effort. The present invention  
permits users having disabilities which have reduced the  
mobility of the wrist, arm or shoulder to use a  
toothbrush for cleaning teeth. The toothbrush, according  
15 to the present invention, has a long and large handle for  
use by disabled persons or by others who are assisting  
the disabled person to brush his teeth. The toothbrush  
head is dimensioned to cover from two to four teeth at  
once. In one embodiment of the present invention,  
20 bristles are mounted on both sides of the toothbrush head

to allow for simultaneous brushing of the upper and lower teeth with a single back-and-forth brushing movement.

The principle of simultaneous upper and lower brushing has been described in French Patent No. 8900637 Menier.

- 5 See also, French Patent No. 8018960 to Pelosse and Patent Nos. W086/07527 and W089/01303 to Hausser.

#### SUMMARY OF INVENTION

- The present invention includes a toothbrush head mounted to a handle, the toothbrush head having a
- 10 generally trapezoidal shape with the larger base of the trapezoid located at the distal end of the toothbrush, and the narrower base of the trapezoid formed with the handle. The toothbrush head has a working side with an elongate flat center portion extending along the
- 15 longitudinal axis of the head, and further has a pair of lateral edges disposed on either side of the flat center portion. A first set of bristles extends from the flat center portion and oriented to extend in a direction generally perpendicular to the flat center portion and a
- 20 second set of bristles extends from each of the lateral edges and is oriented in a direction inclined to the perpendicular toward the longitudinal axis of the head.

#### DESCRIPTION OF THE DRAWINGS

- In order that the invention may be clearly
- 25 understood and readily carried into effect, a preferred embodiment of the invention will now be described, by way

of example only, with reference to the accompanying drawings wherein:

Fig. 1A is a top plan view of the present invention;

Fig. 1B is a top plan view of a second embodiment of  
5 the present invention;

Fig. 2 is a schematic layout of a trapezoidal toothbrush head used with the present invention;

Fig. 3A is a schematic front elevational view of a toothbrush head with brushes removed in accordance with  
10 the present invention;

Fig. 3B is a schematic front elevational view of the toothbrush head shown in Fig. 3A;

Fig. 3C is a schematic front elevational view showing an alternative construction of the toothbrush  
15 head shown in Fig. 3B;

Fig. 4A is a schematic front elevational view of a head showing another embodiment of the present invention;

Fig. 4B is a schematic front elevational view of the toothbrush head shown in Fig. 4A; and

20 Fig. 4C is a schematic front elevational view of a toothbrush head showing an alternative construction of the toothbrush head shown in Fig. 4B.

#### DESCRIPTION OF A PREFERRED EMBODIMENT

An ergonomic toothbrush 10 according to the present  
25 invention is shown in Figs. 1A and 1B. The toothbrush 10 includes a handle 12, having a longitudinal axis, which is integrally formed with an elongate head portion 14

having a longitudinal axis. The handle 12 according to a first embodiment, is coaxially aligned with the longitudinal axis of the head portion 14, as shown in Fig. 1A. In the toothbrush embodiment shown in Fig. 1B, 5 the handle 12 is angularly offset by an angle  $\alpha$  with the longitudinal axis of the head portion 14. The angle  $\alpha$  generally ranges between 0 to 20 degrees.

The handle 12 has a rounded middle portion having a diameter (Pc) and includes two thinner distal parts with 10 a diameter (Pd). The diameter Pc is sized to be between 12 mm and 20 mm. Further, the diameters Pc and Pd are selected to meet the following relationship:  $1.5 < Pc/Pd < 3$ .

It is also understood that the handle 12 may have flattened areas to receive the thumb of a user so that 15 the toothbrush can be easily manipulated.

The shape of the head 14 is shown in Fig. 2. The head has a generally trapezoidal shape with rounded edges. The working length (L) of the head in a preferred embodiment is from 12 to 35 mm. The larger base (L2) of 20 the trapezoidal head is located at the distal end of the toothbrush 10 and the smaller base (L1) of the trapezoidal head is joined to the handle 12, as shown in Figs. 1A and 1B. In a preferred embodiment, L2 ranges from 12 to 35 mm and L1 ranges from 6 to 12 mm.

25 Fig. 3A shows a schematic elevational view of head 14 according to one embodiment. In this embodiment, the head 14 has two lateral edges 16 and 18 extending on either side of a central flat area 20. In the embodiment

shown in Fig. 3A, the lateral edges 16 and 18 have angled surfaces 17 and 19 inclined at an angle  $\alpha_1$  to the horizontal. In a preferred embodiment, this  $\alpha_1$  includes a range between 15 and 80 degrees.

5        A plurality of tufts of bristles 24 extend from the flat surface 20 of the head and a plurality of tufts of bristles 26 extend from the lateral edges 16 and 18 in a conventional manner, as shown. The bristles 24 attached to the flat surface 20 have a length ( $L_v$ ) which ranges  
10        from 3 to 9 mm. These bristles 24 are oriented to extend in a direction generally perpendicular to the flat surface 20, but optionally, can project at an angle between 0 and 15 degrees from the vertical. The bristles 24 are arranged in from one to four rows extending  
15        parallel to the longitudinal axis of the head 14.

      Fig. 3B shows a head 14 having the bristles located only on one side of the head. Fig. 3C shows another embodiment having the bristles located on both the sides of the head. One side is the mirror image of the other.  
20        Locating the bristles on both sides of the head allows for simultaneously brushing of the teeth in the upper and lower dental arches.

      The brushes 26 are attached to the lateral surfaces 17 and 19 to extend in a direction  $\alpha_2$  with respect to the  
25        vertical. This  $\alpha_2$  may range between 5 to 30 degrees. The bristles 26 are arranged in one to three rows on the lateral edges 16 and 18.

      The bristles 26 are made from material that is from

about 12 to 20 hundredths of a mm in diameter in order not to aggress the periodontal tissue and range in length (Lo) from 6 to 14 mm. Further, each of the tufts contain from 40 to 60 bristles to give sufficient rigidity to effect proper cleaning. Where only one row of bristle tufts 26 are used, each of the tufts range in diameter from 1.7 to 2.8 mm. With this arrangement, the bristles 26 extend above the bristles 24. This enables a user to cover the external and internal sides of the teeth while bristles 24 clean the crown portions of the teeth. Additionally, as shown in Fig. 3C, the length dimensions are selected such that the free ends of the brushes 26 on one lateral edge 16 extends toward the free ends of the bristles 26 on lateral edge 18 leaving a distance (d) between the free ends of the bristles associated with each lateral edge. This distance (d) ranges from 2 to 8 mm. In a preferred embodiment, the ratio of the length (Lo) and the length (Lv) is described by the relation  $1.1 < L_o/L_v < 1.8$ . Further, when the bristles 26 are arranged in rows, the angle of inclination of the bristles in the exterior rows is greater than the angle of inclination of the bristles in the interior rows.

Another embodiment of the present invention is shown in Figs. 4A-4C. In this embodiment, the lateral edges 16a and 16b do not present inclined surfaces 17 and 19. Instead, edges 16a and 16b are raised a distance (H) from the flat center portion 20 as shown in Fig. 4A. The height (H) ranges from about 1 to 3 mm. The brushes 24

extend from the flat area 20a in a manner similar to that shown in Fig. 3B. The brushes 26 extend from the raised lateral edges 16a and 18a and project at an angle  $\alpha_2$ , as shown in Fig. 4A. Again, the distance (d) between the  
5 free ends of brushes 26 is between 2 and 8 mm, with the distance (d) selected to correspond with the teeth to be brushed. The distance (d) is preferably between 5 and 8 mm for molar and pre-molar areas, and the distance (d) can be between 2 and 5 mm for the incisor and canine  
10 teeth area.

Fig. 4C shows brushes located on both sides of head 14, while Fig. 4B shows the brushes located on only one side of the head 14.

In using the present invention, the working side of  
15 the toothbrush head is applied to the teeth and drawn back and forth over the teeth with a conventional brushing action. The brushes 24 contact the molar and pre-molar areas and can also be used for brushing the canine teeth and incisors. The brushes 26 are used to  
20 brush the coronary contour of the teeth, and used to clean the sulcus. Having bristles 26 located on either side of the teeth allows the brush to clean the external and internal sides of the teeth while the brushes 24 clean the grinding areas of the teeth.

25 While the fundamental features of the invention have been shown and described, it should be understood that various substitutions, modifications, and variations can be made by those skilled in the art without departing

from the spirit or scope of the invention. Accordingly, all such modifications or variations are included in the scope of the invention as defined by the following claims.